REMARKS

RCE under 37 CFR §1.114

This Amendment accompanies a Request for Continued Examination (RCE) and associated fee under 37 CFR §1.17(e). A petition for a 2 month extension of time and associated fee are also attached. Applicants believe that no additional fees are required. However, the Commissioner is authorized to charge our Deposit Account No. 08-2789 for any additional fees or credit the account for any overpayment.

Claims

Upon entry of the present Amendment, claims 1-10 and 21-23 will be pending in the application with claims 1 and 23 being in independent form. Claims 1, 8, and 21 have been amended to further clarify the invention. Claims 22 and 23 have been added. There is full support in the specification as originally filed for the amendments to claims 1, 8, and 21 and for new claims 22 and 23. Reconsideration is respectfully requested.

Double Patenting

Claims 1-3, 5, 6, and 8-10 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 6, 7, and 9-11 of co-pending Application No. 10/924,270. Although a Terminal Disclaimer has not been submitted in conjunction with the present Amendment, Applicants are prepared to submit such a Terminal Disclaimer in the future upon an indication of allowable subject matter by the Examiner.

Claim Rejections – 35 U.S.C. §112, first paragraph

Claims 1-10 and 21 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. According to the Examiner, the claims

contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. With respect to claims 1-10, the Examiner points out that the limitation of the powder/gas conditioning chamber being "different from the gas/powder exchange chamber" is not supported by the written description. Applicants respectfully disagree and contend that Figure 3 clearly shows that the powder/gas conditioning chamber 80 is not the same as the gas/powder exchange chamber 49, i.e., it is "different" than the gas/powder exchange chamber 49. Nonetheless, Applicants have amended claim 1 to recite that the powder/gas conditioning chamber 80 is "downstream" from the gas/powder exchange chamber 49 to overcome the rejection to claims 1-10. With respect to dependent claim 21, the Examiner states that the limitation of the temperature of the particles being increased "at least 150 degrees Kelvin as a result of the powder/gas conditioning chamber" is not supported by the written description, but requires an upper limit of 250 degrees Kelvin as stated in paragraph [0041]. Applicants submit that paragraph [0041] refers to an example in which the powder/gas conditioning chamber is approximately 240 millimeters in length and that the specification and drawings fully support dependent claim 21 and a rise in particle temperature of at least 150 degrees Kelvin without an upper limit. Nevertheless, dependent claim 21 has been amended to overcome this rejection to place this application in condition for allowance.

Claim Rejections – 35 U.S.C. §112, second paragraph

Claims 1-10 and 21 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. In particular, the Examiner believes the limitation of the powder/gas conditioning chamber being "different" than the gas/powder exchange chamber is unclear. This limitation has been removed from independent claim 1 to overcome this rejection. The Examiner also believes that the terms "increasing" and "residence time",

which were added in the previous Amendment, render independent claim 1 unclear. While Applicants believe that independent claim 1 is clear as written, Applicants have amended independent claim 1 to further clarify the invention. In particular, independent claim 1 now recites that "the powder/gas conditioning chamber has a length along a longitudinal axis of equal to or greater than 80 millimeters to provide a residence time that the particles are exposed to the main gas between the gas/powder exchange chamber and the nozzle." Claim 1 further recites that the residence time is sufficient to increase a temperature of the particles "between the gas/powder exchange chamber and the nozzle" and facilitate adherence of the particles to the substrate "without heating the particles to a temperature above the melting temperature of the particles." As a result of these amendments, Applicants respectfully submit that the rejection to claims 1-10 has been overcome. The Examiner has also indicated that dependent claim 21 is unclear for reciting that "the temperature of the particles is increased at least 150 degrees Kelvin as a result of the powder/gas conditioning chamber." Applicants have amended dependent claim 21 to recite that the temperature of the particles increase as the particles travel "in the powder/gas conditioning chamber from the gas/powder exchange chamber to the nozzle." As a result of these amendments, Applicants respectfully submit that the rejection to dependent claim 21 has been overcome.

Claims Rejections – 35 U.S.C. §103(a)

Claims 1-6 and 8-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Van Steenkiste et al. (U.S. Patent No. 6,283,386) in view of Kay et al. (U.S. Pub No. 2001/0042508, issued as U.S. Patent No. 6,502,767). Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Van Steenkiste et al. in view of Kay et al. and further in view of Schwarz et al. (U.S. Patent No. 5,273,957). Applicants have amended claim 1.

Independent claim 1 defines over the cited prior art, either alone or in combination, by reciting a method of kinetic spray coating a substrate that requires, among other things,

entraining particles of a powder into a flow of main gas in a gas/powder exchange chamber 49 and directing the entrained particles to a powder/gas conditioning chamber 80 disposed downstream of the gas/powder exchange chamber 49. The powder/gas conditioning chamber 80 has a length L along a longitudinal axis of equal to or greater than *80 millimeters* to expose the particles to the main gas for a sufficient amount of time to increase a temperature of the particles without heating the particles to a temperature above a melting temperature of the particles. From the powder/gas conditioning chamber 80, the particles enter a converging diverging supersonic nozzle 54. The increase in temperature of the particles between the gas/powder exchange chamber and the nozzle facilitates adherence of the particles to the substrate.

Van Steenkiste et al. and Kay et al. disclose kinetic spraying systems that include a gas/powder exchange chamber for entraining particles of a powder into a main gas and directing the entrained particles into a nozzle, but they lack a powder/gas conditioning chamber disposed between the gas/powder exchange chamber and the nozzle that has a length equal to or greater than *80 millimeters*. Notably, the inventive significance of the powder/gas conditioning chamber and its length equal to or greater than *80 millimeters* (e.g. 240 millimeters) can easily be realized with reference to Figure 4 and Paragraph [0041] of the subject application. Here, the increase in temperature of the particles due to the existence of the powder/gas conditioning chamber, as compared to a system that only includes a gas/powder exchange chamber going directly to a nozzle, such as in Van Steenkiste et al. and Kay et al., can be realized by comparing reference lines 100, 102, and 104 to reference lines 106, 108, and 110.

The Examiner indicates on page 15 of the Final Office Action that the use of a longer gas/powder exchange chamber is explicitly desired by Van Steenkiste et al. in order to provide a higher overall gas/powder mixture temperature, which results in a higher particle velocity and better adherence of the particles to a substrate. The Examiner believes that one skilled in the art would be motivated to meet this desire by adding the teachings of the

adjustable powder feeder tube in Kay et al. Applicants respectfully submit that even if these references could be properly combined, they still would not teach a powder/gas conditioning chamber with a length of *80 millimeters* or greater. In fact, one of the inventors has analyzed a number of commercially available kinetic spraying systems (either the systems themselves or photographs of the systems), including one from ASB Industries (owner of Kay et al.), and one embodied in Van Steenkiste et al., and has estimated that even if the powder feed tubes were adjusted to maximize a length of the chamber between the powder feed tube and the nozzle, it would be impossible to have a chamber with a length of *80 mm or greater*. Simply stated, the dimensions of these prior art systems are such that there is not enough room between the powder feed tube and the nozzle to place such a chamber.

For these reasons, Applicants respectfully submit that independent claim 1 is in condition for allowance. Applicants also submit that dependent claims 2-10, 21, and 22 are in condition for allowance based on their own merits, and based on their dependency to independent claim 1 and the failure of the references to suggest claim 1.

Independent claim 23 has been added to the application. Independent claim 23 defines over the cited prior art, either alone or in combination, by reciting a method of kinetic spray coating a substrate that requires, among other things, entraining particles of a powder into a flow of main gas in a gas/powder exchange chamber 49 and directing the entrained particles to a powder/gas conditioning chamber 80 disposed downstream of the gas/powder exchange chamber 49. The powder/gas conditioning chamber 80 has a length L along a longitudinal axis that is sufficient to increase a temperature of the particles from about 150 degrees Kelvin to about 250 degrees Kelvin as the particles travel in the powder/gas conditioning chamber between the gas/powder exchange chamber and the nozzle. The increase in temperature of the particles between the gas/powder exchange chamber and the nozzle facilitates adherence of the particles to the substrate.

The increase in the *particle* temperature as recited in claim 23 has been found by the inventors to improve the adherence of the particles to the substrate and neither Van

Steenkiste et al. nor Kay et al. disclose, teach, or suggest increasing particle temperature from about 150 degrees Kelvin to about 250 degrees Kelvin as the particles travel in the powder/gas conditioning chamber between the gas/powder exchange chamber and the nozzle.

Applicants believe the application is now in condition for allowance, which allowance is respectfully solicited. Applicants believe that no additional fees are required. However, the Commissioner is authorized to charge our Deposit Account No. 08-2789 for any additional fees or credit the account for any overpayment.

Respectfully submitted,
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